



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,588	02/18/2004	Hoe-Seong Ha	4591-384	4745
20575	7590	07/13/2004	EXAMINER	
MARGER JOHNSON & MCCOLLOM PC 1030 SW MORRISON STREET PORTLAND, OR 97205			ESTRADA, MICHELLE	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 07/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/782,588	Applicant(s) HA ET AL.	
	Examiner Michelle Estrada	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/765,543.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Luning (6,005,279) and Arafa et al. (6,294,823).

Re claim 1, Luning discloses selectively etching a predetermined portion of a semiconductor substrate (41) to form a trench (45) defining an active region having a top surface; forming a device isolation region (47) in the trench, the device isolation region having a protrusion which is higher in level than the top surface of the active region (Fig. 4J); forming a gate pattern (50) on the active region; forming a lightly doped drain (LDD) region (48) in the active region on both sides of the gate pattern (Fig. 4L); forming an insulating layer (51) for forming a spacer on the resultant structure including the LDD region, anisotropic etching the insulating layer for forming a spacer to form a gate spacer (53) on a sidewall of the gate pattern and to form an etch stop spacer (52) on the sidewall of the protrusion of the device isolation region; forming an impurity diffusion region in the active region.

Luning does not disclose sequentially forming an etch stop layer and an interlayer insulating layer over the resultant structure, wherein the insulating layer for forming a spacer is formed of a material having an etching selectivity with respect to the

Art Unit: 2823

interlayer insulating layer; and successively patterning the interlayer insulating layer and the etch stop layer to form a contact hole exposing at least a portion of the impurity diffusion region.

Arafa et al. disclose forming a device isolation region (209) in the trench; forming a gate pattern on the active region (Fig. 4a); forming a lightly doped drain (LDD) region (207) in the active region on both sides of the gate pattern (Fig. 4L); sequentially forming an etch stop layer (220) and an interlayer insulating layer (225) over the resultant structure, wherein the insulating layer for forming a spacer is formed of a material having an etching selectivity with respect to the interlayer insulating layer; and successively patterning the interlayer insulating layer and the etch stop layer to form a contact hole (210) exposing at least a portion of the impurity diffusion region.

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Luning and Arafa et al. to enable the step of Arafa et al. to be performed in the process of Luning because borderless contacts can be isolated from the well, while the decreased spacing between devices, which borderless contacts provide may be preserved.

Re claim 2, Arafa et al. disclose that the etch stop spacer is made of silicon nitride (Col. 5, line 26).

Re claim 3, Arafa et al. disclose that the etch stop layer is made of silicon nitride (Col. 5, line 26).

Re claim 5, Arafa et al. disclose wherein the contact hole exposes both the impurity diffusion region and the portion of the etch stop spacer adjacent to the exposed impurity diffusion region (Fig. 2).

Re claim 6, Arafa et al. Disclose wherein the etch stop spacer is partially etched (Fig. 2).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Luning and Arafa et al. as applied to claims 1-3,5 and 6 above, and further in view of Noda (6,373,119).

Arafa et al. disclose forming a contact plug in the contact hole (210).

The combination of Luning and Arafa et al. does not disclose forming an interconnection line overlying the contact plug.

Noda discloses an interconnection line (12) overlying a contact plug (11) (Col. 10, lines 30-34); forming a device isolation region (4); forming a gate pattern (7) on an active region (Fig. 7).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Luning, Arafa et al. and Noda to enable the interconnection line formation step of Noda. to be performed in the process of Luning and Arafa et al. because it will provide connection between the contact plug and the interconnection line.

Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is 571-272-1858. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2800.


MEstrada
July 9, 2004


George Fourson
Primary Examiner
Art Unit 2823